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FLOOD INSURANCE STUDY

VILLAGE OF JEWETT, OHIO

HARRISON COUNTY

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JULY 4, 1988

COMPLETED

Federal Emergency Management Agency

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FLOOD INSURANCE STUDY

VILLAGE OF JEWETT,
HARRISON COUNTY,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Jewett, Harrison County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey (USGS), Water Resources Division (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Interagency Agreement No. EMW-85-E-1823, Project Order No. 00600. This study was completed in January 1987.

1.3 Coordination

On January 15, 1985, an initial Consultation and Coordination Officer meeting was held with representatives of FEMA; the Ohio Department of Natural Resources, Division of Water; the Village of Jewett; and the Study Contractor. Coordination with town officials and Federal and state agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data.

On August 25, 1987, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Jewett, Harrison County, Ohio. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of Conotton Creek and Conotton Creek Overflow Channel, which flows through the southern section of the village, was studied in detail.

Areas having low development potential or minimum flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for the Village of Jewett, Ohio (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through January 1992. The scope and methods of study were proposed to and agreed upon by FEMA and the Village of Jewett.

2.2 Community Description

The Village of Jewett is located in northeastern Harrison County, Ohio, and is surrounded by the unincorporated areas of the county. Jewett is approximately 30 miles east of the City of Steubenville and 7 miles north of the Village of Cadiz. Jewett is served by the Norfolk Southern Railway, and State Routes 151 and 9. The 1980 population of the Village of Jewett was estimated to be 972, a 7.9-percent increase from the estimated 1970 population of 901 (Reference 2). The average annual precipitation of the study area is 40 inches and is fairly uniformly distributed throughout the year (Reference 3).

2.3 Principal Flood Problems

The low-lying areas adjacent to Conotton Creek within the corporate limits of Jewett are subject to periodic flooding. The largest discharge recorded at Conotton Creek at Jewett, located at the Center Street bridge, occurred on March 4, 1963. The maximum elevation of this flood was 1,000.14 feet National Geodetic Vertical Datum of 1929 (NGVD), with a peak discharge of 1,170 cubic feet per second (cfs).

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area.

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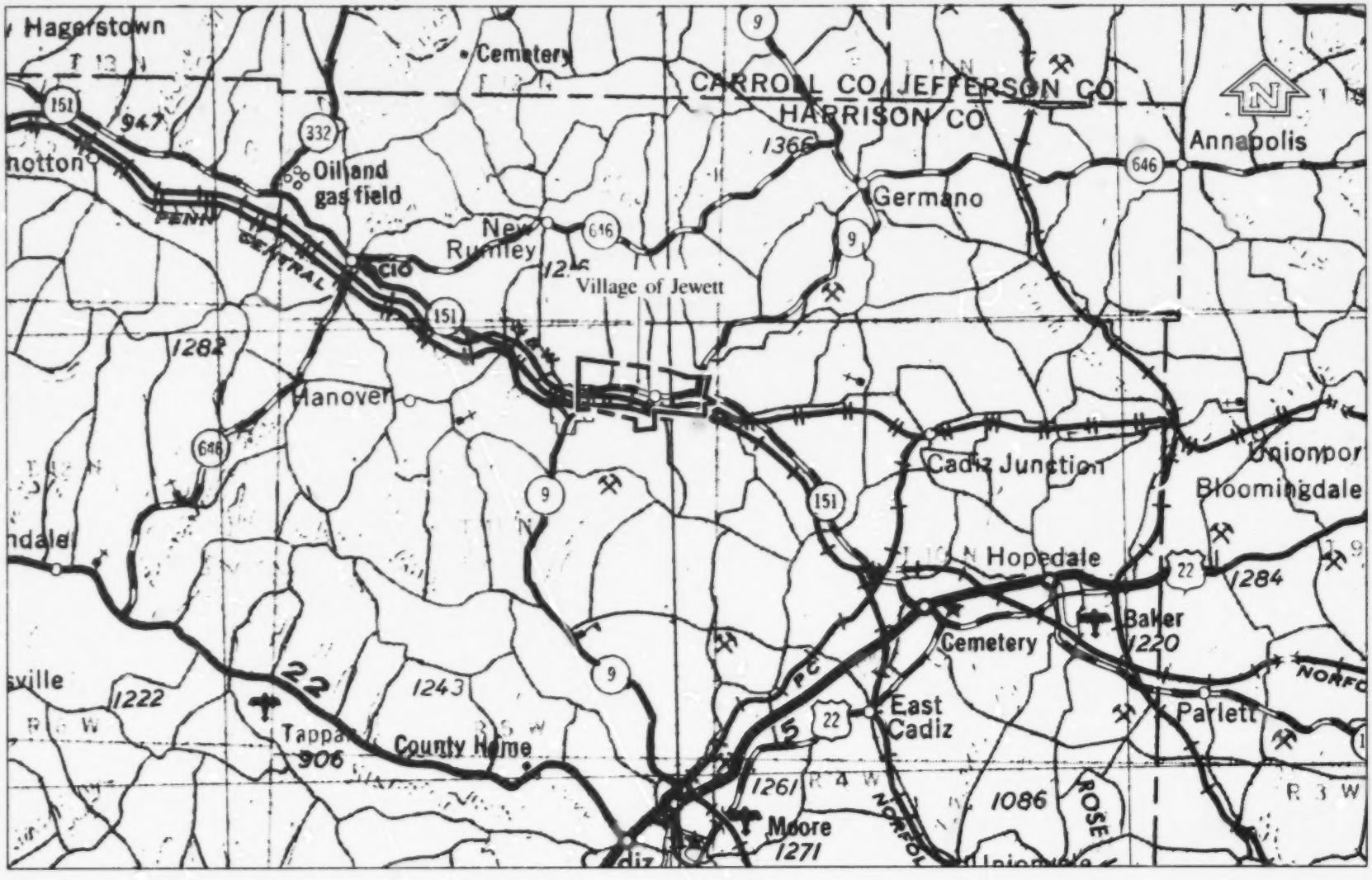

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF JEWETT
(HARRISON CO.)

APPROXIMATE SCALE
2 0 2 4 6 MILES

VICINITY MAP

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

A log-Pearson Type III flood frequency analysis was performed on peak flow data from the USGS stream gage on Conotton Creek at Jewett. The flood frequency analysis was performed on 35 years of systematic record (1947-1981) in accordance with guidelines recommended in Water Resources Council Bulletin 17B (Reference 4).

Peak discharge-drainage area relationships for the 100-year flood of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
CONOTTON CREEK		
just upstream of Jefferson Creek Tributary	7.49	1,350
at USGS stream gage (no. 03119700) just upstream of Center Street	14.30	1,560

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

For the backwater analyses, cross sections were obtained from a field survey, and their locations are shown on the flood profiles and map. Structural geometry and elevations for bridges and road sections were also obtained from field survey data.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map.

Channel roughness factors (Manning's "n") used in hydraulic computations were chosen by engineering judgment based on field observations of floodplain areas. Roughness values ranged from 0.030 to 0.055 for the channel and ranged from 0.030 to 0.100 for the overbank areas.

Water-surface elevations for the 100-year flood were computed by WSPRO, a step-backwater computer program developed by the USGS for the Federal Highway Administration (Reference 5). The starting water-surface elevation for Conotton Creek was determined by slope conveyance from data obtained from field surveys.

From the hydraulic analysis of the 100-year flooding it was determined that approximately 32 percent of the main-channel flow escapes the confines of the main channel near the intersection of Cadiz Street and Water Street, creating an overflow channel. The flow in the overflow channel follows a path roughly parallel to the main channel, and the two flows are separated by the railroad embankment located on the right bank of the main channel. The flow in the overflow channel rejoins the main-channel flow downstream through a culvert located beneath the right-bank railroad embankment approximately 80 feet upstream of the downstream corporate limit.

The hydraulic base line added to the Conotton Creek Overflow Channel is used strictly for measurement purposes.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 20 feet (Reference 6).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Village of Jewett (Reference 1).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

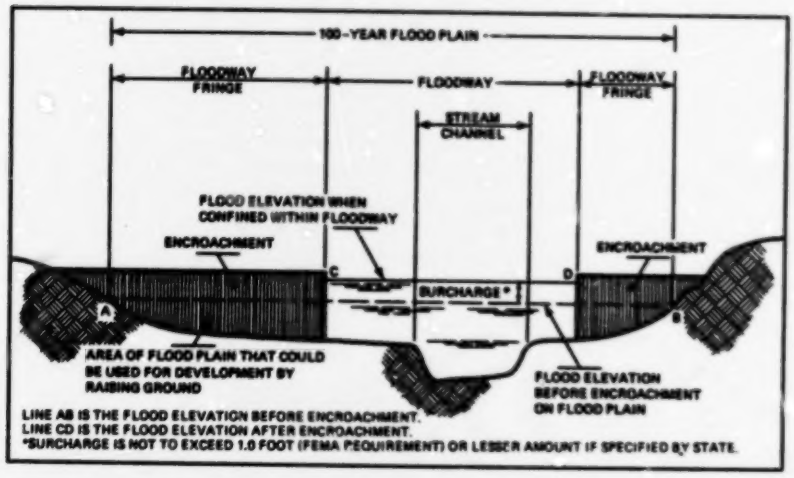
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
CONOTTON CREEK								
A	155	74	414	3.0	1003.9	1003.9	1004.8	0.9
B	1045	53	265	4.7	1006.1	1006.1	1006.8	0.7
C	1880	61	353	3.5	1008.3	1008.3	1009.0	0.7
D	2525	85	435	2.9	1010.3	1010.3	1011.1	0.8
E	3105	54	413	2.6	1011.4	1011.4	1012.1	0.7
F	3475	100	759	2.1	1012.3	1012.3	1013.1	0.8
G	3705	50	452	3.5	1012.4	1012.4	1013.1	0.7
H	3895	80	505	3.1	1012.4	1012.4	1013.3	0.9
I	4225	155	1025	1.5	1012.5	1012.5	1013.5	1.0
J	4355	135	1009	1.6	1012.5	1012.5	1013.5	1.0
K	4585	150	804	1.9	1012.6	1012.6	1013.6	1.0
L	5315	100	516	2.6	1013.3	1013.3	1014.1	0.8
M	6010	100	350	3.9	1014.1	1014.1	1015.0	0.9
CONOTTON CREEK OVERFLOW CHANNEL								
A	155[2]	150	362	0.9	1004.5	1004.5	1004.7	0.2
B	1045[2]	150	182	1.8	1006.0	1006.0	1006.1	0.1
C	1880[2]	70	130	2.5	1007.4	1007.4	1007.8	0.4
D	2525[2]	52	104	3.1	1010.9	1010.9	1011.1	0.2
E	3090[2]	35	86	5.7	1012.0	1012.0	1012.7	0.7

[1]FEET ABOVE CORPORATE LIMITS
[2]FEET ALONG HYDRAULIC BASELINE

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF JEWETT, OH
(HARRISON CO.)

FLOODWAY DATA

CONOTTON CREEK—CONOTTON CREEK OVERFLOW CHANNEL

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Village of Jewett (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 300 South Wacker Drive, Chicago, Illinois 60606.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Jewett, Harrison County, Ohio, May 1976.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

3. Ohio Division of Water, Hydrologic Atlas of Annual Precipitation, Temperature, Streamflow, and Water Loss in Ohio, Inventory Report No. 13, 1962.

4. U.S. Department of the Interior, Geological Survey, Interagency Advisory Committee on Water Data, Office of Water Data Coordination, Hydrology Subcommittee, Bulletin 17B, Guidelines for Determining Flood Flow Frequency, March 1976, revised September 1981.

5. U.S. Department of Transportation, Federal Highway Administration, Report No. FHWA/RD-86/108, Bridge Waterways Analysis Model: Research Report, J.O. Shearman, W.H. Kirby, V.R. Snyder, and H.N. Flippo, July 1986.

6. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 20 feet: Jewett, Ohio, 1962, photorevised 1978, photoinspected 1982; Cadiz, Ohio, 1960, photorevised 1972.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0001	1011.09	tablet stamped "TT3DCB 1958 1011" in northwest abutment wall of concrete bridge located 423 feet south of intersection of Main Street and Center Street
2	0001	1011.57	chiseled square on southeast abutment of Water Street bridge over Conotton Creek
3	0001	1011.06	chiseled square on southeast concrete wingwall of Main Street bridge located about 250 feet west of intersection of Main Street and W & LE Street
4	0001	1010.53	chiseled square on northeast concrete wingwall of Cross Street bridge over Conotton Creek
5	0001	1012.58	chiseled square on northwest concrete wingwall of High Street bridge over Jefferson Creek

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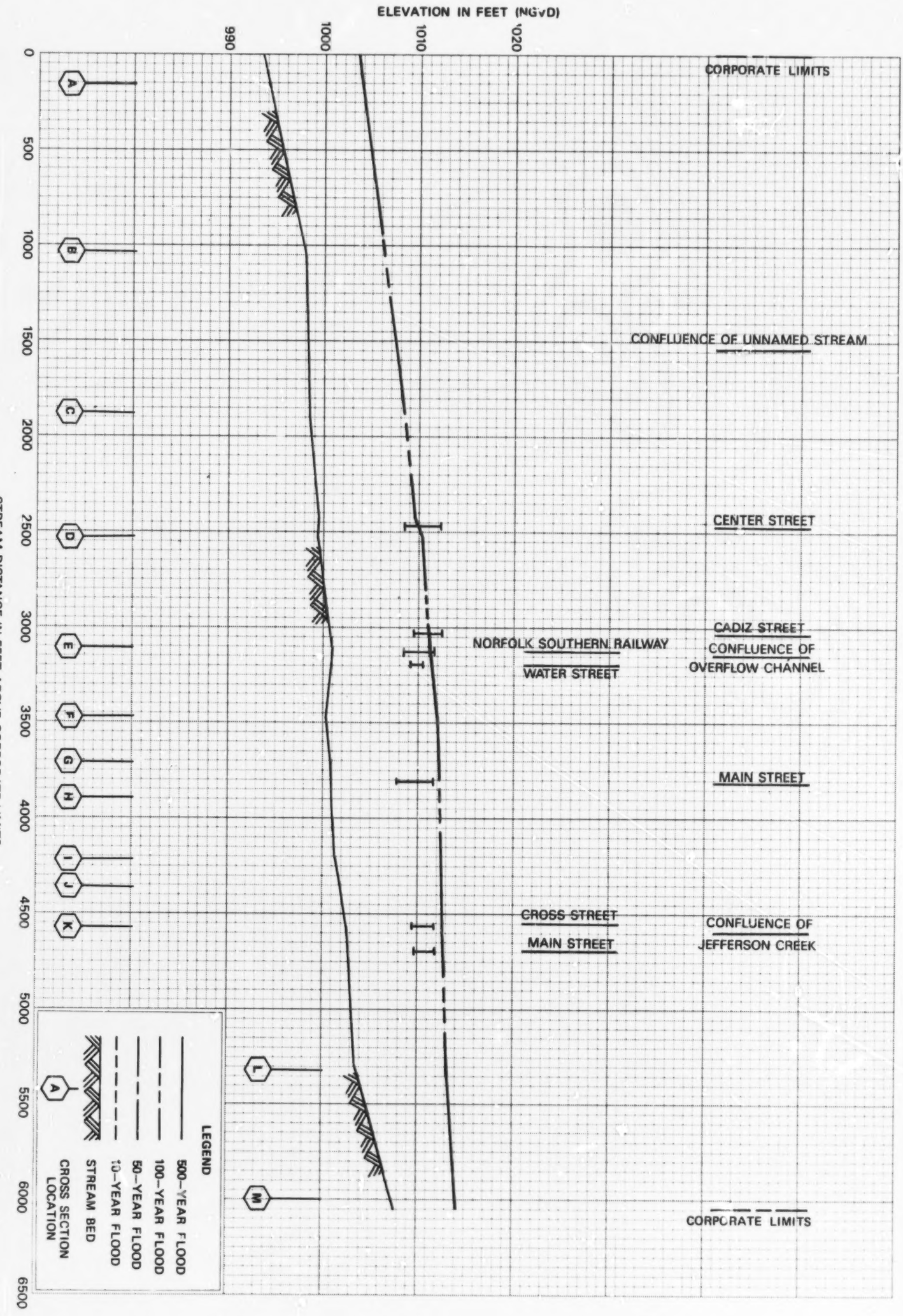

01P	FEDERAL EMERGENCY MANAGEMENT AGENCY **VILLAGE OF JEWETT, OH** (HARRISON CO.)	**FLOOD PROFILES** **CONOTTON CREEK**

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02P	FEDERAL EMERGENCY MANAGEMENT AGENCY **VILLAGE OF JEWETT, OH** (HARRISON CO.)	**FLOOD PROFILES** **CONOTTON CREEK OVERFLOW CHANNEL**